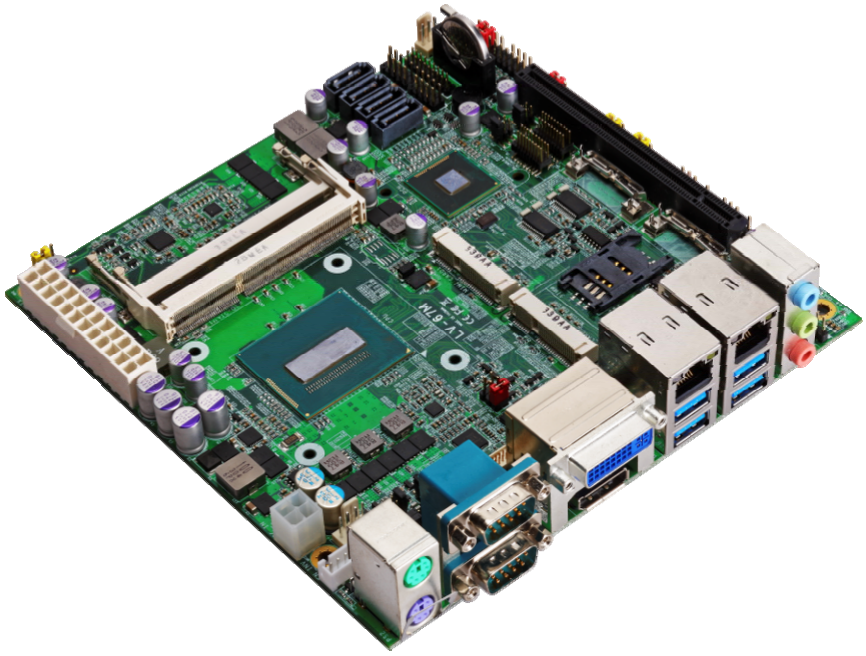
# LV-67M

## Mini-ITX Motherboard

**User's Manual**

Edition 1.6
2015/05/22



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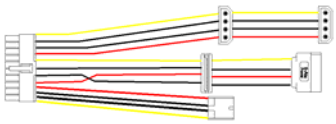
## Packing List:

**Please check the package content before you starting using the board.**

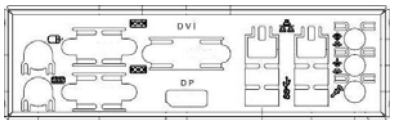
1 x LV-67M Mini-ITX Motherboard
(include Cooler Fan)

2 x SATA Cable
(OALSATA3-L / 1040529)

1 x DC Power Cable
(OALDC-A / 1040433)

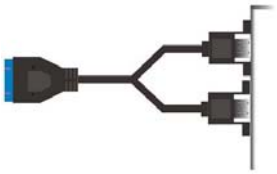


1 x Power Cable
(OALATX-P3S2 / 1040058)

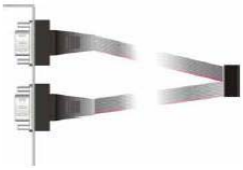



1 x I/O Shield
(OALATE-MCDLA / 1270055)

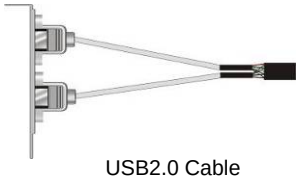
## Optional:



USB3.0 Cable
(OALUSB3 / 1040531)



Dual COM PORT Cable
(OALES-BKU2 / 1040087)



USB2.0 Cable
(OALUSBA-1 / 1040172)

VGA Cable x 1
(OALVGAN-S / 1040568)

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# Chapter 1 <Introduction>

## 1.1 <Product Overview>

**LV-67M** is Mini-ITX Motherboard which supports 4th Generation Intel® Core™ i7, i5, i3, Celeron Mobile Processor and features Intel DH82QM87 chipset, integrated HD Graphics, DDR3L memory, Realtek High Definition Audio, Intel Gigabit LAN, Serial ATA with AHCI and RAID function for a system.

### Intel Haswell Processor

The 4th Generation Intel® Core™ mobile processor family is the next generation of 64-bit, multi-core mobile processor built on 22- nanometer process technology. Based on a new micro-architecture.

### Intel Lynx Point chipset

The DH82QM87 chipset provides better CPU, graphics, media performance, flexibility and more enhanced security that is suitable for a variety of intelligent systems the ideal choice.

### All in One multimedia solution

Based on Intel DH82QM87 chipset, the board provides high performance onboard graphics, 24-bit dual channel LVDS interface, DisplayPort, DVI-I, and High Definition Audio, to meet the very requirement of the multimedia application.

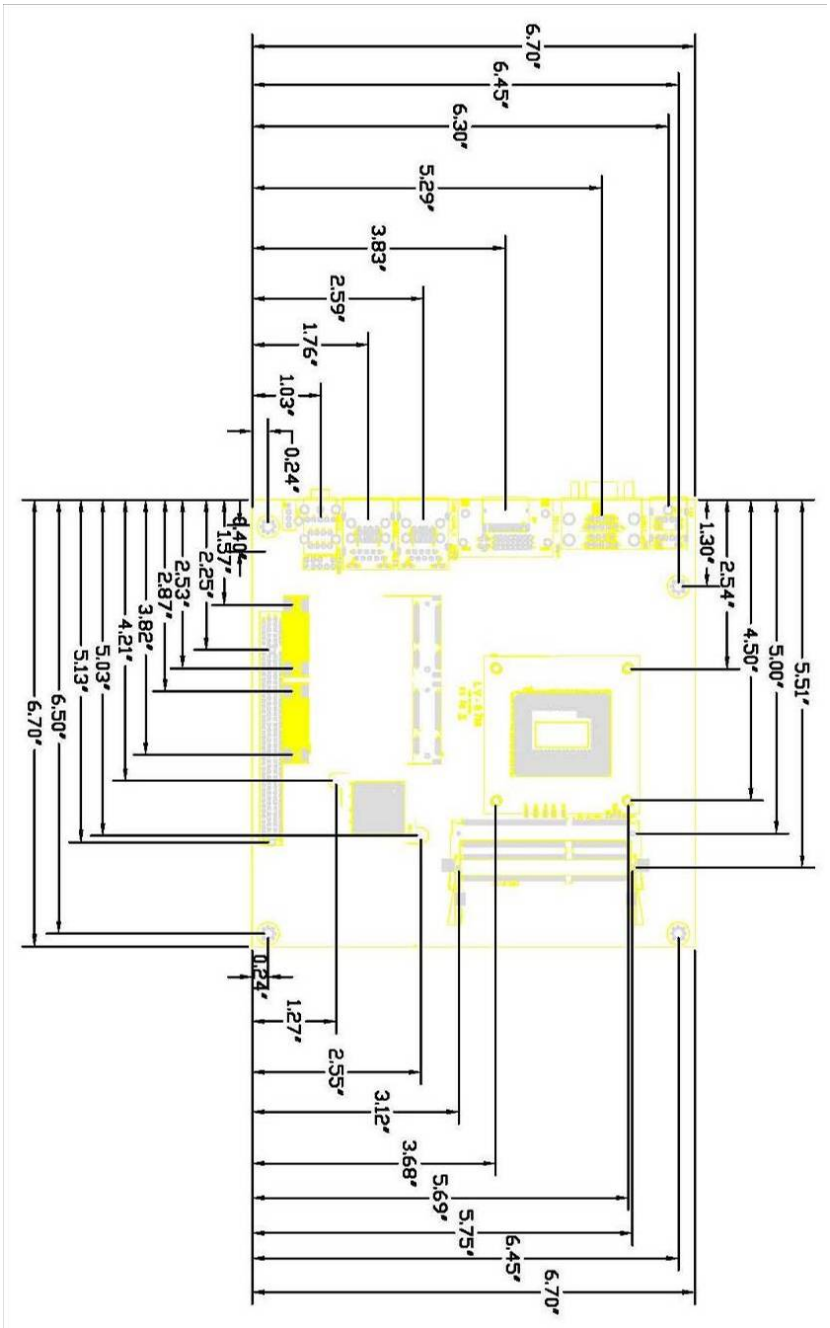
### Flexible Expansion Interface

The board provides one PCIe X16 slot, two Mini PCIe slot with one SIM slot.

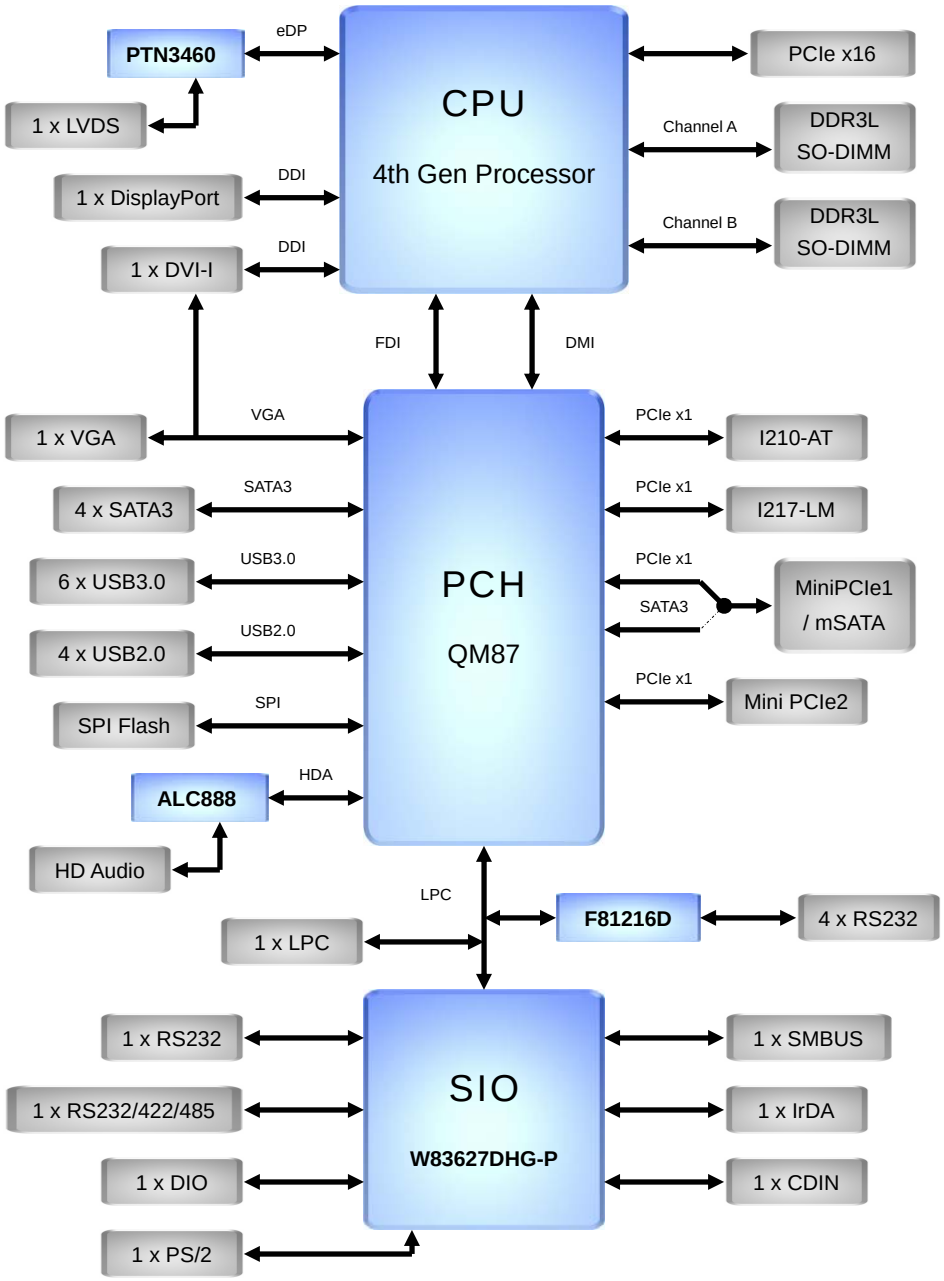
## 1.2 <Product Specification>

| | |
|---|---|
| **System** | |
| Processor | 4th Gen Intel® Core™ i7, i5, i3, Celeron Mobile Processor<br>FCBGA1364 package |
| Chipset | Intel® DH82QM87 PCH |
| Memory | 2 x DDR3L SO-DIMM 1333/1600 MHz up to 16GB<br>Support Non-ECC, unbuffered memory only |
| Watchdog Timer | Generates a system reset with internal timer for 1min/s ~ 255min/s |
| Real Time Clock | Chipset integrated RTC with onboard lithium battery |
| Expansion | 1 x PCIe x16, 2 x Mini PCIe (one support mSATA), 1 x SIM slot<br>Note that mSATA Only Support SATA3 |
| **Graphics** | |
| Chipset | Intel® 4th Gen integrated HD Graphics |
| Display Interface | 1 x VGA, 1 x DVI-I, 1 x DisplayPort, 1 x LVDS |
| **LAN** | |
| Chip | 1 x Intel® I210-AT Gigabit LAN<br>1 x Intel® I217-LM Gigabit LAN (Support iAMT9.0) |
| **I/O** | |
| Serial ATA | 4 x SATA3 support RAID0, 1, 5, 10 and IRST<br>Note that Hard Disk Only Support SATA3 |
| Audio | Realtek ALC888 HD Audio |
| Digital I/O | Programmable 8-bit GPIO with 12 pin-header |
| Internal I/O | 4 x SATA3, 4 x RS232, 4 x USB2.0, 2 x USB3.0, 1 x VGA, 1 x LVDS, 1 x LCD inverter, 1 x LPC, 1 x SMBUS, 1 x DIO, 1 x Front panel Audio, 1 x CDIN, 1 x IrDA |
| Rear I/O | 1 x PS/2, 1 x RS232/422/485, 1 x RS232, 1 x DVI-I, 1 x DisplayPort, 4 x USB3.0, 2 x LAN, 1 x Audio |
| **Mechanical & Environmental** | |
| Power Requirement | ATX or DC Input 9~24V<br>Note that do not use at the same time |
| Size & Thickness | 170mm x 170mm (L x W), 1.6mm |
| Temperature | Operating within 0°C~60°C (32°F~140°F)<br>Storage within -20°C~80°C (-4°F~176°F) |
| Relative Humidity | 10%~90%, non-condensing |

## 1.3 <Mechanical Drawing>

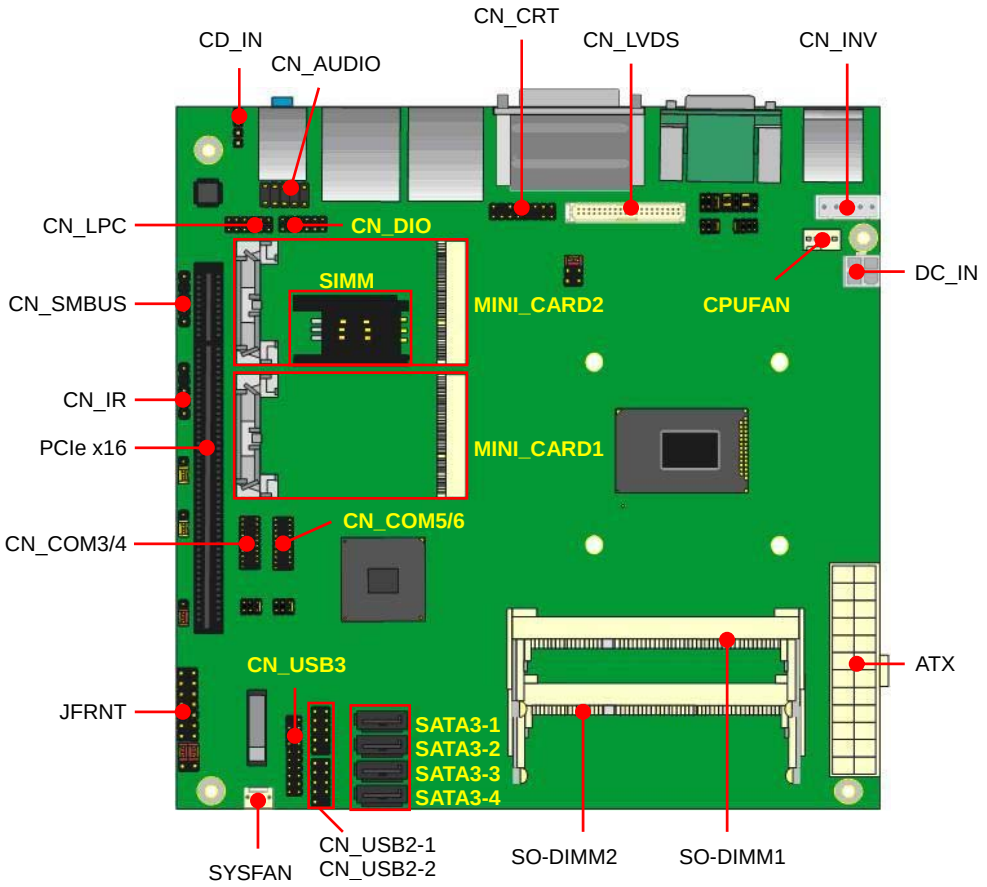


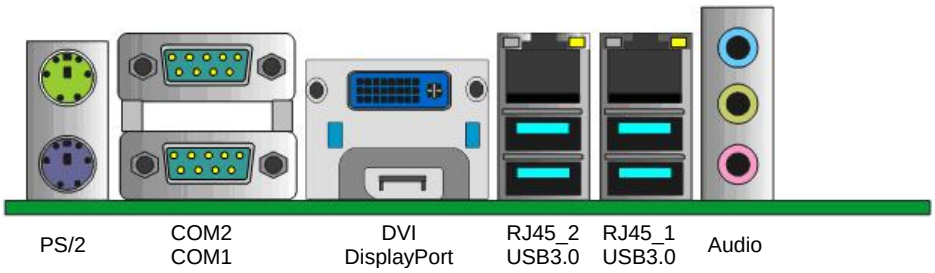
# 1.4 <Block Diagram>



# Chapter 2 <Hardware setup>

## 2.1 <Connector Location and Reference>



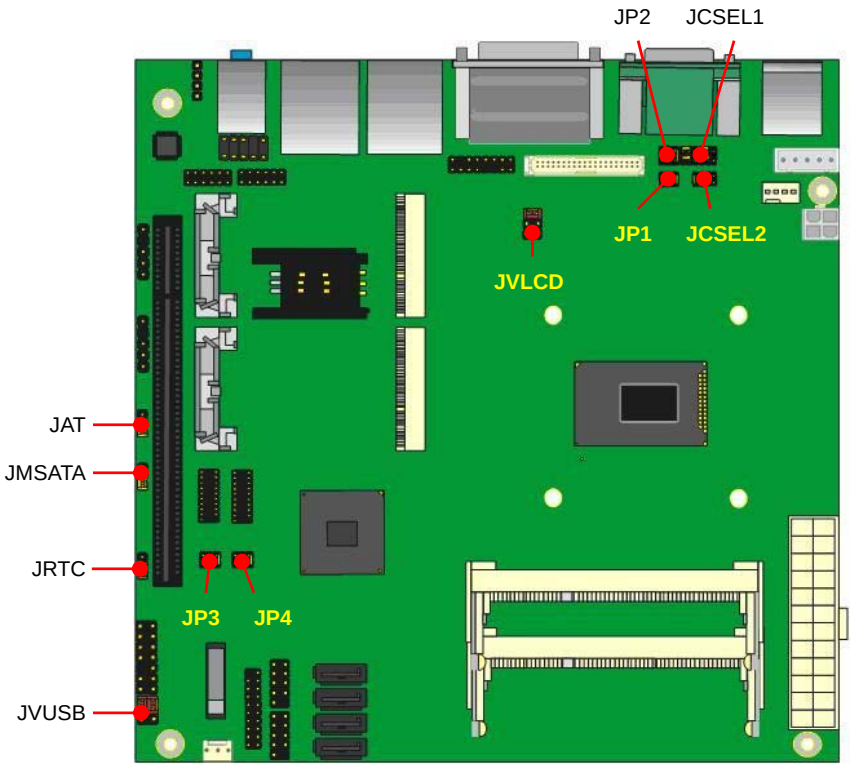
### 2.1.1 <Internal connectors list>

| Connector | Function |
|---|---|
| **SO-DIMM1/2** | 204-pin DDR3 SO-DIMM slot |
| **SATA3-1/2/3/4** | 7-pin Serial ATA3 connector |
| **CN_AUDIO** | 5 x 2-pin audio pin header |
| **CN_DIO** | 6 x 2-pin GPIO pin header |
| **CN_LPC** | 6 x 2-pin LPC pin header |
| **CN_CRT** | 8 x 2-pin CRT pin header |
| **CN_LVDS** | 20 x 2-pin LVDS connector |
| **CN_INV** | 5 x 1-pin LCD inverter pin header |
| **CN_SMBUS** | 5 x 1-pin SMBUS pin header |
| **CN_IR** | 5 x 1-pin IR pin header |
| **CN_COM3/4** | 10 x 2-pin RS232 pin header |
| **CN_COM5/6** | 10 x 2-pin RS232 pin header |
| **CN_USB2-1/2** | 5 x 2-pin USB2.0 pin header |
| **CN_USB3** | 10 x 2-pin USB3.0 pin header |
| **CD_IN** | 5 x 1-pin CD-ROM audio input pin header |
| **CPUFAN** | 4-pin CPU smart fan connector |
| **SYSFAN** | 3-pin system fan connector |
| **JFRNT** | 7 x 2-pin front panel switch/indicator pin header |
| **MINI_CARD1/2** | 52-pin mini PCIe card slot |
| **SIMM** | 6-pin SIM card slot |
| **PCIe x16** | 164-pin support PCIe x16 slot |
| **DC_IN** | ATX12V connector support DC 9~24V input |
| **ATX** | 20+4-pin main power connector |

### 2.1.2 <External connectors list>

| Connector | Function |
|---|---|
| **PS/2** | PS/2 female connector for keyboard and mouse |
| **COM1/2** | DB9 male connector |
| **DVI** | DVI-I dual link connector |
| **DisplayPort** | DisplayPort connector |
| **USB_RJ45_1/2** | 2 x USB3.0 and 1 x RJ45 connector |
| **AUDIO** | Audio jack support Line-in, Line-out, Mic-in |

# 2.2 <Jumper Location and Reference>



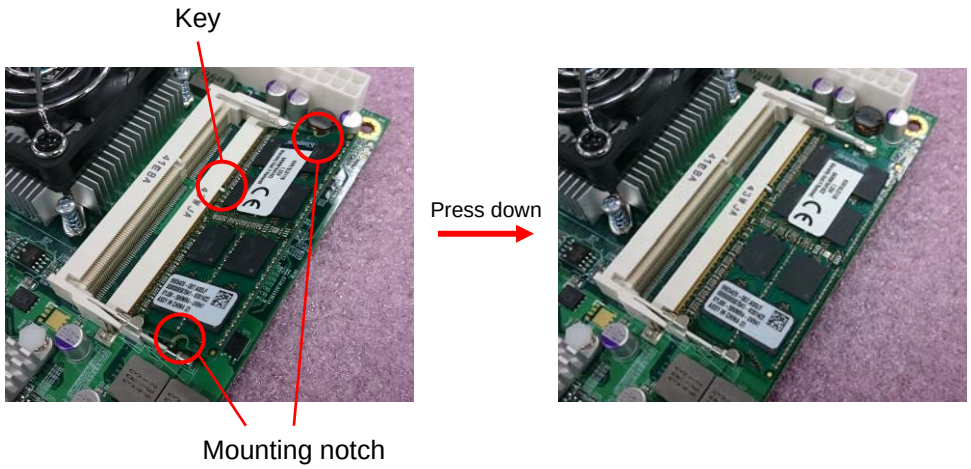

## 2.2.1 <Jumper list>

| Jumper | Function |
|---|---|
| **JAT** | Power mode select |
| **JRTC** | CMOS Normal/Clear Setting |
| **JVUSB** | USB 5V/5VSB Setting |
| **JVLCD** | Panel Voltage Setting |
| **JMSATA** | MiniCard1 mSATA Setting |
| **JCSEL1** | COM2 RS-232, RS422, RS485 setting or IrDA setting |
| **JCSEL2** | COM2 RS-232, RS422, RS485 setting or IrDA setting |
| **JP1** | Com1 Voltage Setting (For Pin 9) |
| **JP2** | Com2 Voltage Setting (For Pin 9) |
| **JP3** | Com3 Voltage Setting (For Pin 9) |
| **JP4** | Com4 Voltage Setting (For Pin 9) |

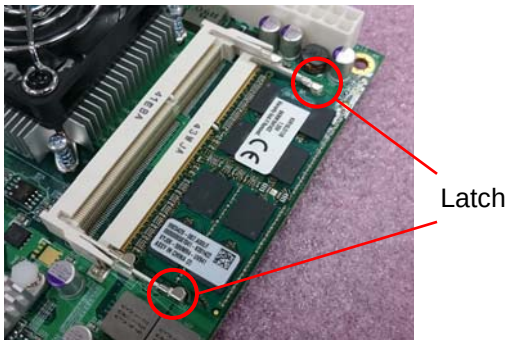
## 2.3 <Installing the Memory>

**In the process, the board must be powered off.**

1. Put the memory tilt into the slot. Note the Memory notch key aligned slot key.
2. Then press down till lock into the mounting notch.




3. To remove the memory, push outward on both sides of the latch.



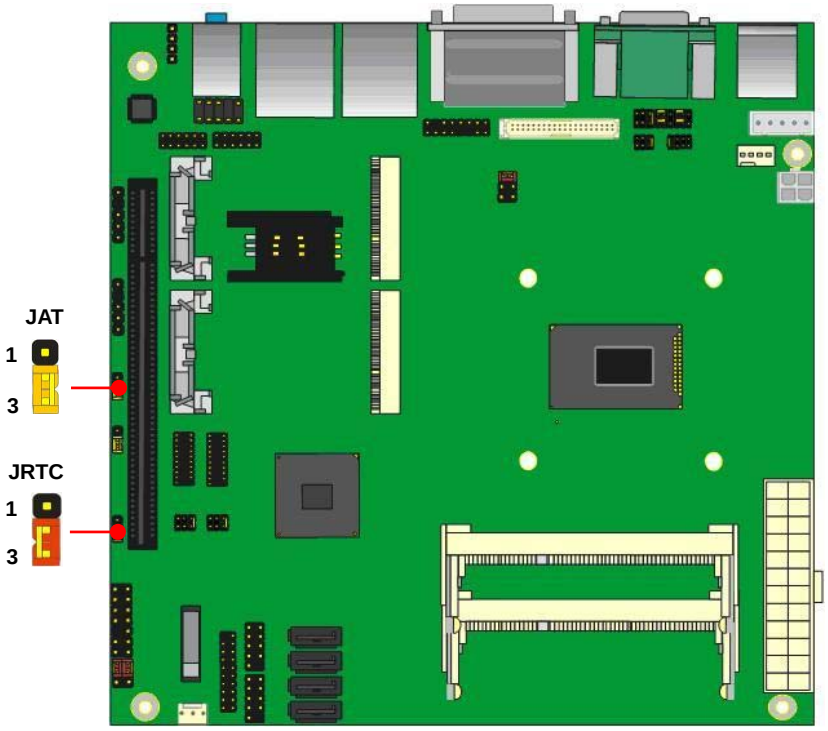
## 2.4 <Clear CMOS and Power on type selection>

**JRTC**: Clear CMOS data jumper

| Jumper settings | Function |
|---|---|
| **1-2** | Clear CMOS |
| **2-3** | Normal (Default) |

**JAT**: AT/ATX mode select jumper

| Jumper settings | Function |
|---|---|
| **1-2** | AT mode |
| **2-3** | ATX mode (Default) |



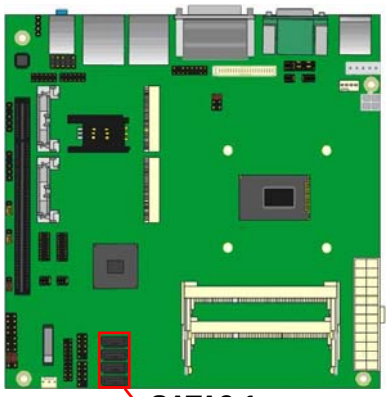
# 2.5 <I/O interface>

## 2.5.1 <Serial ATA interface>

**SATA3-1/2/3/4**: SATA 7-pin connector

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | TX+ |
| 3 | TX- |
| 4 | GND |
| 5 | RX- |
| 6 | RX+ |
| 7 | GND |

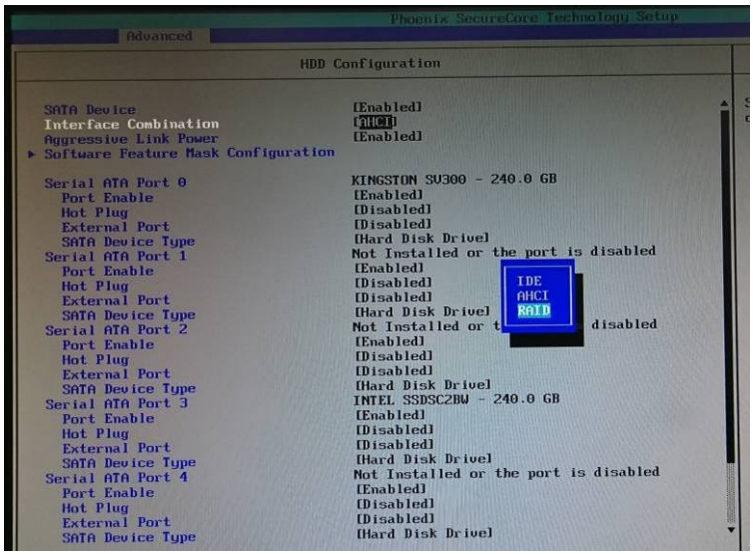
Support RAID0, 1, 5, 10.



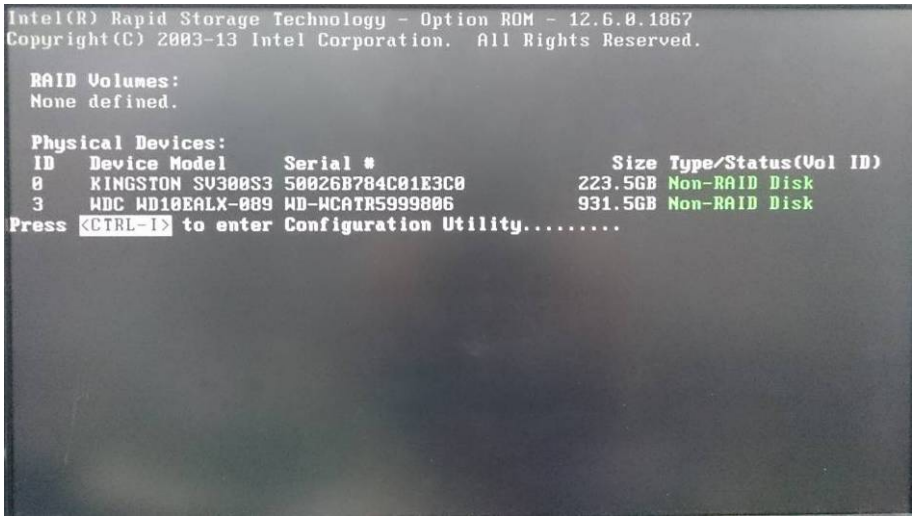
**SATA3-1**
**SATA3-2**
**SATA3-3**
**SATA3-4**

When use RAID function, it need to enter the BIOS set RAID mode first.

[Advanced] > [HDD Configuration] > [Interface Combination] > [RAID]

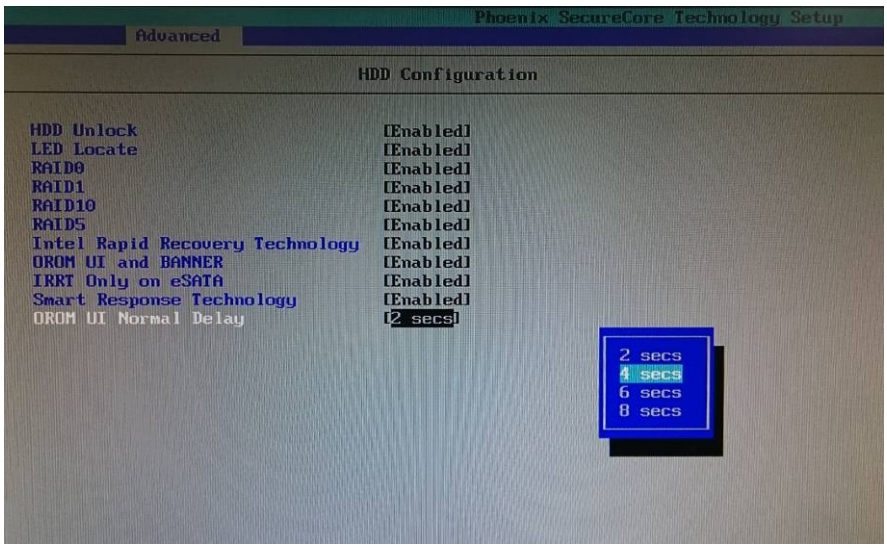

Phoenix SecureCore Technology Setup
Advanced
HDD Configuration
SATA Device [Enabled]
Interface Combination [AHCI]
Aggressive Link Power [Enabled]
Software Feature Mask Configuration
Serial ATA Port 0 KINGSTON SV300 - 240.0 GB
Port Enable [Enabled]
Hot Plug [Disabled]
External Port [Disabled]
SATA Device Type [Hard Disk Drive]
Serial ATA Port 1 Not Installed or the port is disabled
Port Enable [Enabled]
Hot Plug [Disabled]
External Port [Disabled]
SATA Device Type [Hard Disk Drive]
Serial ATA Port 2 Not Installed or t disabled
Port Enable [Enabled]
Hot Plug [Disabled]
External Port [Disabled]
SATA Device Type [Hard Disk Drive]
Serial ATA Port 3 INTEL SSDSC2BW - 240.0 GB
Port Enable [Enabled]
Hot Plug [Disabled]
External Port [Disabled]
SATA Device Type [Hard Disk Drive]
Serial ATA Port 4 Not Installed or the port is disabled
Port Enable [Enabled]
Hot Plug [Disabled]
External Port [Disabled]
SATA Device Type [Hard Disk Drive]
IDE
AHCI
RAID

At boot time, press <CTRL + I> to enter the RAID configuration menu.


Intel(R) Rapid Storage Technology - Option ROM - 12.6.0.1867
Copyright(C) 2003-13 Intel Corporation. All Rights Reserved.
RAID Volumes:
None defined.
Physical Devices:
ID Device Model Serial # Size Type/Status(Vol ID)
0 KINGSTON SV300S3 50026B784C01E3C0 223.5GB Non-RAID Disk
3 WDC WD10EALX-089 WD-WCATR5999806 931.5GB Non-RAID Disk
Press <CTRL-I> to enter Configuration Utility.....

If this screen stop time is too short, it can be set in the BIOS.

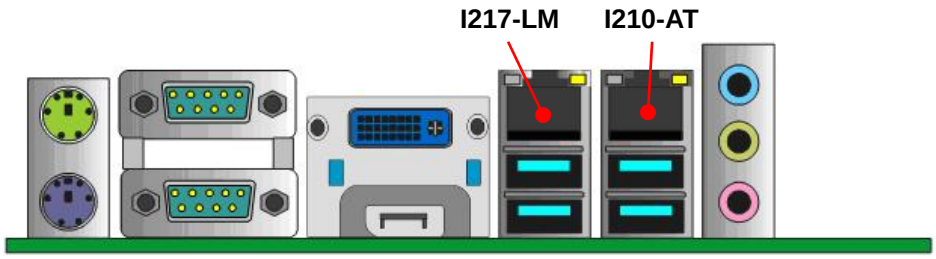
[HDD Configuration] > [Software Feature Mask Configuration] > [OROM UI Normal Delay] (Need to set RAID mode first)



### 2.5.2 <Ethernet interface>

The board Integrated I210-AT and I217-LM Gigabit Ethernet which supports WOL on rear I/O. The I217-LM support Intel® AMT 9.0 feature, if want to use, need to enable in the BIOS.

(Note that your CPU must support vPro technology, ex: i7-4700EQ)

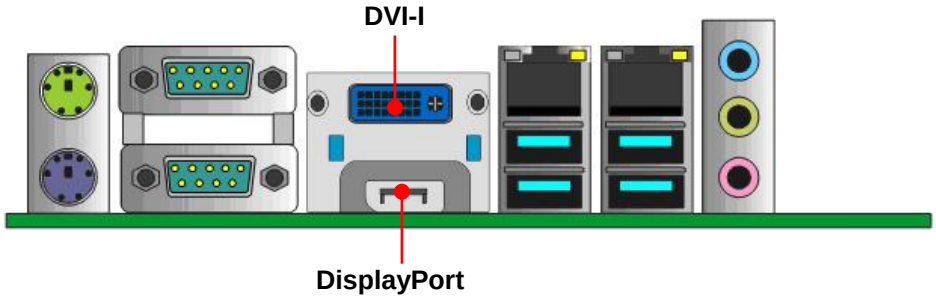


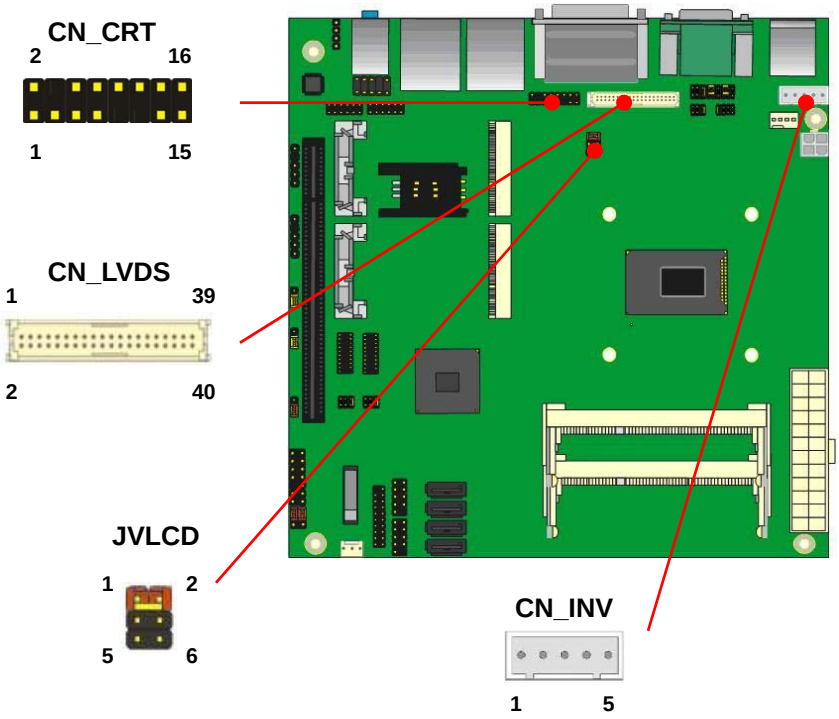

### 2.5.3 <Display interface>

Based on the 4th Gen CPU with built-in HD Graphics, the DVI-I resolution up to **1920x1200** @ **60Hz** and DisplayPort up to **3840x2160** @ **60Hz** on rear I/O.

About the internal Display, the VGA resolution up to **1920x1200** @ **60Hz** and LVDS (PTN3460) up to **1920x1200** @ **60Hz** support 24-bit color depth and dual channel.

The built-in HD Graphics support triple display function with clone mode and extended mode.






**CN_CRT**: VGA 16-pin header (Pitch 2.00mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | RED | **2** | GREEN |
| **3** | BLUE | **4** | Key |
| **5** | DETECT | **6** | GND |
| **7** | GND | **8** | GND |
| **9** | Key | **10** | DETECT |
| **11** | Key | **12** | SDA |
| **13** | HSYNC | **14** | VSYNC |
| **15** | SCL | **16** | NC |

Note that pin 5, 10 active low.

**CN_LVDS**: LVDS 40-pin connector (Model: HIROSE DF13-40DP-1.25V compatible)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **2** | Set by JVLCD | **1** | Set by JVLCD |
| **4** | GND | **3** | GND |
| **6** | A_LVDS_0- | **5** | B_LVDS_0- |
| **8** | A_LVDS_0+ | **7** | B_LVDS_0+ |
| **10** | GND | **9** | GND |
| **12** | A_LVDS_1- | **11** | B_LVDS_1- |
| **14** | A_LVDS_1+ | **13** | B_LVDS_1+ |
| **16** | GND | **15** | GND |
| **18** | A_LVDS_2- | **17** | B_LVDS_2- |
| **20** | A_LVDS_2+ | **19** | B_LVDS_2+ |
| **22** | GND | **21** | GND |
| **24** | A_LVDS_CLK- | **23** | B_LVDS_3- |
| **26** | A_LVDS_CLK+ | **25** | B_LVDS_3+ |
| **28** | GND | **27** | GND |
| **30** | A_LVDS_3- | **29** | B_LVDS_CLK- |
| **32** | A_LVDS_3+ | **31** | B_LVDS_CLK+ |
| **34** | GND | **33** | GND |
| **36** | LVDS_DDCSCL | **35** | NC |
| **38** | LVDS_DDCSDA | **37** | NC |
| **40** | NC | **39** | NC |

**CN_INV**: LVDS 5-pin Backlight power header

| Pin | Signal |
|---|---|
| **1** | 12V |
| **2** | Backlight Control |
| **3** | GND |
| **4** | GND |
| **5** | Enable Backlight |

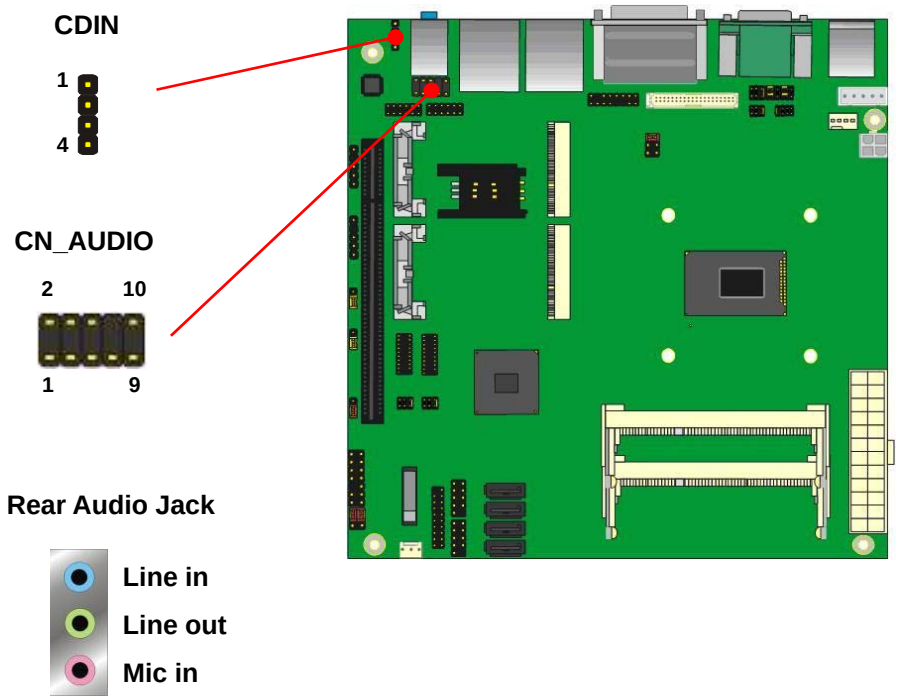
**JVLCD**: LVDS panel power select jumper

| Jumper settings | Function |
|---|---|
| **1-2** | 3.3V (Default) |
| **3-4** | 5V |
| **5-6** | 12V |

**Effective patterns of connection: 1-2 / 3-4 / 5-6**

**Other may cause damage**

## 2.5.4 <Audio interface>



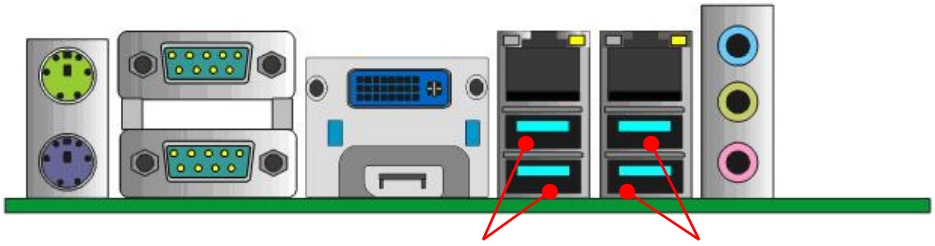

**CDIN**: CD-ROM audio input 4-pin header (Pitch 2.54mm)

| Pin | Signal |
|---|---|
| 1 | CD_L |
| 2 | GND |
| 3 | GND |
| 4 | CD_R |

**CN_AUDIO**: Front panel audio 10-pin header (Pitch 2.54mm)

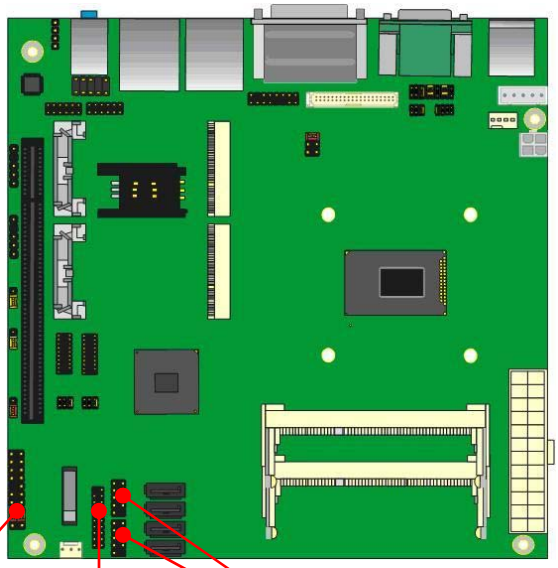
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | MIC_L | 2 | GND |
| 3 | MIC_R | 4 | NC |
| 5 | FP_OUT_R | 6 | MIC_DETECT |
| 7 | SENSE | 8 | Key |
| 9 | FP_OUT_L | 10 | FP_OUT_DETECT |

## 2.5.5 <USB interface>



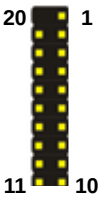
USB3.0-2 Type: 5V/5VSB

USB3.0-1 Type: 5VSB



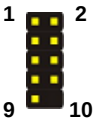
JVUSB

CN_USB3




Type: USB3.0, 5V/5VSB

CN_USB2-1/2




Type: USB2.0, 5VSB

**CN_USB3**: Front panel USB3.0 20-pin header (Pitch 2.00mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **20** | Key | **1** | Set by JVUSB |
| **19** | Set by JVUSB | **2** | SSRX0- |
| **18** | SSRX1- | **3** | SSRX0+ |
| **17** | SSRX1+ | **4** | GND |
| **16** | GND | **5** | SSTX0- |
| **15** | SSTX1- | **6** | SSTX0+ |
| **14** | SSTX1+ | **7** | GND |
| **13** | GND | **8** | DATA0- |
| **12** | DATA1- | **9** | DATA0+ |
| **11** | DATA1+ | **10** | NC |

**CN_USB2-1/2**: Front panel USB2.0 10-pin header (Pitch 2.54mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | VCC (5VSB) | **2** | VCC (5VSB) |
| **3** | DATA0- | **4** | DATA1- |
| **5** | DATA0+ | **6** | DATA1+ |
| **7** | GND | **8** | GND |
| **9** | GND | **10** | Key |

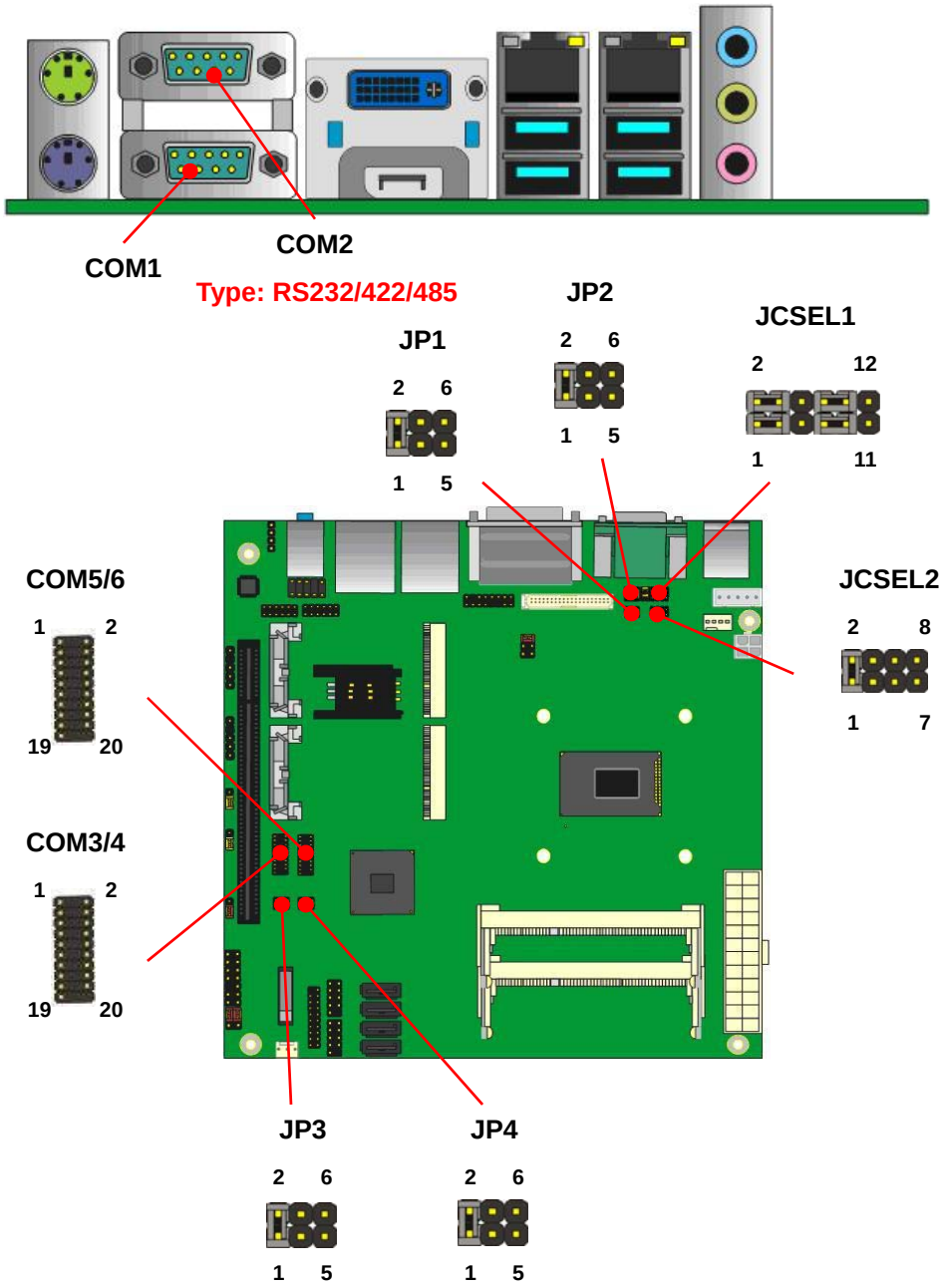
**JVUSB**:USB power type select jumper (Only for USB3.0-2 & CN_USB3)

| Jumper settings | Function |
|---|---|
| **1-3 &2-4** | 5VSB (Default) |
| **3-5 & 4-6** | 5V |

**Effective patterns of connection: 1-3 & 2-4 / 3-5 & 4-6**

**Other may cause damage**

## 2.5.6 <Serial Port interface>



**COM1**: RS232 DB9 connector

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | DCD | **2** | RXD |
| **3** | TXD | **4** | DTR |
| **5** | GND | **6** | DSR |
| **7** | RTS | **8** | CTS |
| **9** | Set by JP1 | | |

**COM2**: RS232/422/485 DB9 connector

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | DCD/ 422TX-/ 485- | **2** | RXD/ 422TX+/ 485+ |
| **3** | TXD/ 422RX+ | **4** | DTR/ 422RX- |
| **5** | GND | **6** | DSR |
| **7** | RTS | **8** | CTS |
| **9** | Set by JP2 | | |

Use JCSEL1 and JCSEL2 to select communication mode

**COM3/4**: COM 20-pin header (Pitch 2.54 x 1.27mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | DCD1 | **2** | RXD1 |
| **3** | TXD1 | **4** | DTR1 |
| **5** | GND | **6** | DSR1 |
| **7** | RTS1 | **8** | CTS1 |
| **9** | COM3 Set by JP3 | **10** | NC |
| **11** | DCD2 | **12** | RXD2 |
| **13** | TXD2 | **14** | DTR2 |
| **15** | GND | **16** | DSR2 |
| **17** | RTS2 | **18** | CTS2 |
| **19** | COM4 Set by JP4 | **20** | Key |

**COM5/6**: COM 20-pin header (Pitch 2.54 x 1.27mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | DCD1 | **2** | RXD1 |
| **3** | TXD1 | **4** | DTR1 |
| **5** | GND | **6** | DSR1 |
| **7** | RTS1 | **8** | CTS1 |
| **9** | RI1 | **10** | NC |
| **11** | DCD2 | **12** | RXD2 |
| **13** | TXD2 | **14** | DTR2 |
| **15** | GND | **16** | DSR2 |
| **17** | RTS2 | **18** | CTS2 |
| **19** | RI2 | **20** | Key |

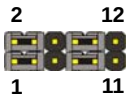
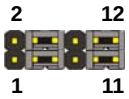
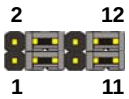
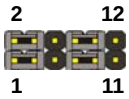
**JP1, JP2, JP3, JP4**: COM1, COM2, COM3, COM4 pin-9 setting

| Jumper settings | Function |
|---|---|
| **1-2** | 5V |
| **3-4** | 12V |
| **5-6** | RI (Default) |

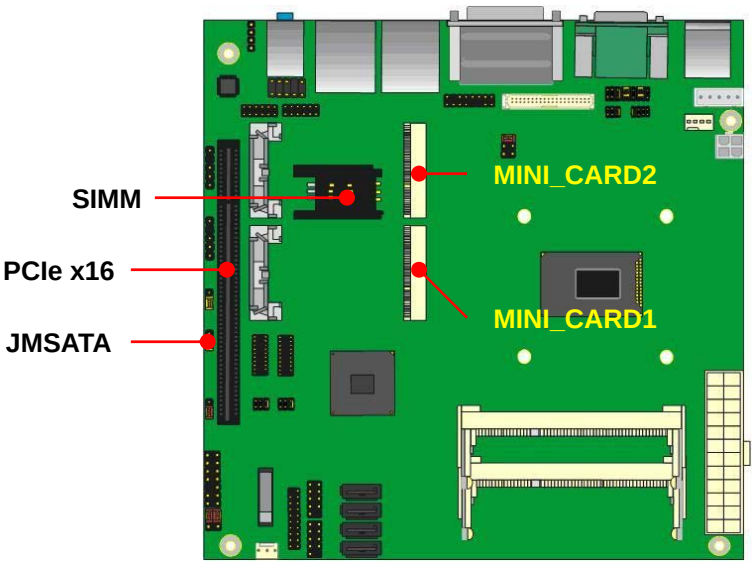
**Effective patterns of connection: 1-2 / 3-4 / 5-6**

**Other may cause damage**

**JCSEL1, JCSEL2**: For configure COM2 communication mode

| Function | JCSEL1 | JCSEL2 |
|---|---|---|
| **RS232** |   | |
| **RS485** |   | |
| **RS422** |   | |
| **IrDA** |   | |

## 2.5.7 <Expansion slot>

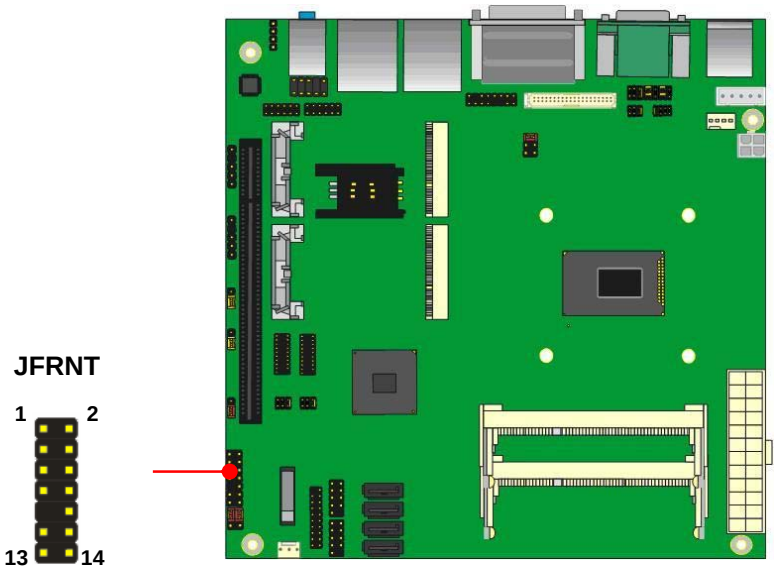



MINI_CARD1 and MINI_CARD2 have do some special design to compatible our mini-PCIe card. (ex: MPX-574D2, MPX-210D2 etc)
MINI_CARD1 support mSATA set by JMSATA, and MINI_CARD2 support SIM card to use 3G module.

**JMSATA**: Setting MINI_CARD1 to support PCIe/mSATA

| Jumper settings | Function |
|---|---|
| **1-2** | Support mSATA |
| **2-3** | Normal operation (Default) |

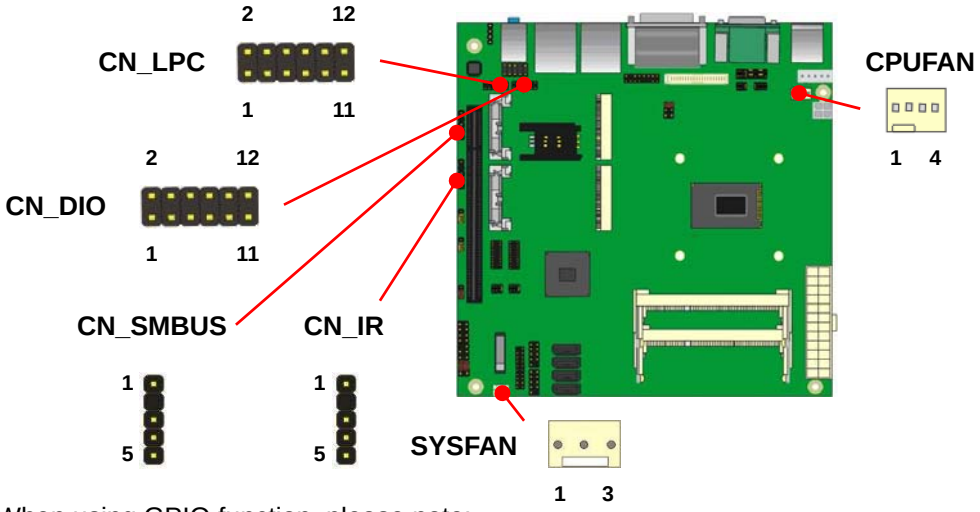
## 2.5.8 <Front panel switch and indicator>




**JFRNT**: Front panel switch and indicator 14-pin header (Pitch 2.54mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | HDD_LED+ | **2** | Power_LED+ |
| **3** | HDD_LED- | **4** | NC |
| **5** | Reset+ | **6** | Power_LED- |
| **7** | Reset- | **8** | Speaker+ |
| **9** | Key | **10** | NC |
| **11** | Power_ON+ | **12** | NC |
| **13** | Power_ON- | **14** | Speaker- |

## 2.5.9 <GPIO and Other interface>




When using GPIO function, please note:

As Output: Open-drain, most applications need use an external pull up resistor. (If not may cause damage)

As Input: TTL-level.

**GPIO DC characteristics**

| Parameter | SYM | MIN | TYP | MAX | UNIT | Conditions |
|---|---|---|---|---|---|---|
| Input Low Voltage | $V_{IL}$ | | | 0.8 | V | |
| Input High Voltage | $V_{IH}$ | 2.0 | | | V | |
| Output Low Voltage | $V_{OL}$ | | | 0.4 | V | $I_{OL}$ =12mA |
| Input High Leakage | $I_{LIH}$ | | | +10 | μA | $V_{IN}$ =3.3V |
| Input Low Leakage | $I_{LIL}$ | | | -10 | μA | $V_{IN}$ =0V |

**CN_DIO**: GPIO 12-pin header (Pitch 2.00mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | GND | 2 | GND |
| 3 | GPIO0 | 4 | GPIO4 |
| 5 | GPIO1 | 6 | GPIO5 |
| 7 | GPIO2 | 8 | GPIO6 |
| 9 | GPIO3 | 10 | GPIO7 |
| 11 | 5V | 12 | 12V |

**CN_LPC**: LPC 12-pin header (Pitch 2.00mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | CLK | **2** | RST |
| **3** | -LFRAME | **4** | LAD3 |
| **5** | LAD2 | **6** | LAD1 |
| **7** | LAD0 | **8** | 3.3V |
| **9** | SERIRQ | **10** | GND |
| **11** | 3.3VSB | **12** | NC |

CN_LPC support TPM module.

**CN_SMBUS**: SMBus 5-pin header (Pitch 2.54mm)

| Pin | Signal |
|---|---|
| **1** | VCC (5V) |
| **2** | Key |
| **3** | SMBDAT |
| **4** | SMBCLK |
| **5** | GND |

**CN_IR**: IrDA 5-pin header (Pitch 2.54mm)

| Pin | Signal |
|---|---|
| **1** | VCC (5V) |
| **2** | Key |
| **3** | IRRX |
| **4** | IRDX |
| **5** | GND |

**CPUFAN**: CPU cooler Smart fan 4-pin header

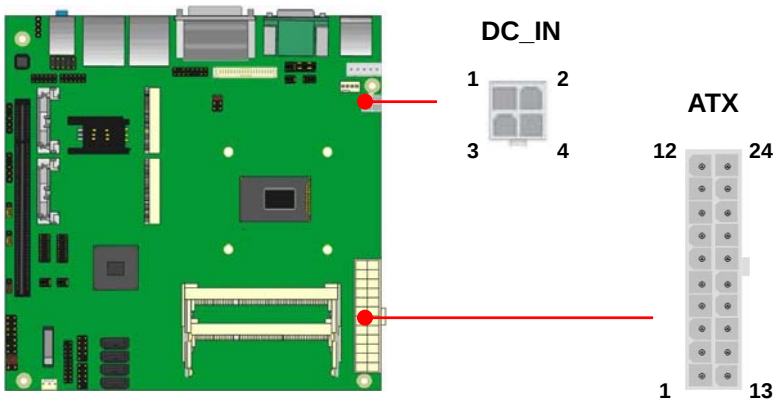
| Pin | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Signal | GND | 12V | Sensor | Control |

**SYSFAN**: System cooler fan 3-pin header

| Pin | 1 | 2 | 3 |
|---|---|---|---|
| Signal | GND | 12V | Sensor |

# 2.6 <Power supply>

## 2.6.1 <Power input>




The DC_IN support 9~24V wide voltage input.

**Note that the DC_IN and ATX do not use at the same time, it will certainly cause damage.**

**DC_IN**: ATX12V 4-pin connector

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | GND | **2** | GND |
| **3** | 9~24V | **4** | 9~24V |

**ATX**: main power 24-pin connector (As input)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | 3.3V | **13** | 3.3V |
| **2** | 3.3V | **14** | -12V |
| **3** | GND | **15** | GND |
| **4** | 5V | **16** | -PSON |
| **5** | GND | **17** | GND |
| **6** | 5V | **18** | GND |
| **7** | GND | **19** | GND |
| **8** | Power_OK | **20** | -5V |
| **9** | 5VSB | **21** | 5V |
| **10** | 12V | **22** | 5V |
| **11** | 12V | **23** | 5V |
| **12** | 3.3V | **24** | GND |

### 2.6.1 <Power output>

It is supply to the HDD, CD-ROM or other device.

**If using DC_IN as input, that ATX will as output.**

**ATX**: main power 24-pin connector (As output)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | 3.3V | **13** | 3.3V |
| **2** | 3.3V | **14** | |
| **3** | GND | **15** | GND |
| **4** | 5V | **16** | |
| **5** | GND | **17** | GND |
| **6** | 5V | **18** | GND |
| **7** | GND | **19** | GND |
| **8** | | **20** | |
| **9** | | **21** | 5V |
| **10** | 12V | **22** | 5V |
| **11** | 12V | **23** | 5V |
| **12** | 3.3V | **24** | GND |

Note that Maximum output power: 12V/2A, 5V/3A, 3.3V/3A

# Appendix A <Flash BIOS>

## A.1 <Flash tool>

The board is based on Phoenix BIOS and can be updated easily by the BIOS auto flash tool. You can download the tool online at the address below:

http://www.commell.com.tw/Download/BIOS/FPT9.rar

The tool's file name is "fpt.exe", it's the utility that can write the data into the BIOS flash chip and update the BIOS.

## A.2 <Flash BIOS process>

1. Please make a bootable UFD which can boot into DOS enviroment.
2. Unzip the flash tool and copy it into bootable UFD.
3. Add a bin file to the same folder..
4. Power on the system and flash the BIOS under the DOS environment.
   (Command: fpt –savemac –f xxx.bin)
5. Restart the system.

# Appendix B <Programmable GPIO >

The GPIO' can be programmed with the MS-DOS debug program using simple IN/OUT commands.

The DC characteristics please refer to GPIO paragraph (Page25).

| GPIO | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Bit | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

-o 2E 87 ;enter configuration
-o 2E 87
-o 2E 07
-o 2F 09 ;select Logical Device
-o 2E 30
-o 2F 02 ;activate GPIO function (The board use GPIO3)
-o 2E F0
-o 2F XX ;set "01" GPIO as input, set "00" GPIO as output
-o 2E F1
-o 2F XX ;if set GPIO as output, this register's value can be set "00~ FF"

Optional

-o 2E F2
-o 2F XX ;set "01", the respective bit are inverted (Both input and output)
;set "00", the respective bit are normal

For further information, please refer to Winbond W83627DHG-P datasheet.

# Appendix C <Programmable Watch Dog Timer>

**Timeout value range**

1 to 255

Minute and Second

**Program sample**

Watchdog timer setup as system reset with 5 second of timeout

```
-o 2E 87        ;enter configuration
-o 2E 87
-o 2E 07
-o 2F 08        ;select Logical Device
-o 2E 30
-o 2F 01        ; activate WDTO# function
-o 2E F5
-o 2F 00        ;set "00" is second mode, set "04" is minute mode
-o 2E F6
-o 2F 05        ;00h: Timeout Disable
                ;01h: Timeout occurs after 1 minute only
                ;02h: Timeout occurs after 2 second/minute
                ;03h: Timeout occurs after 3 second/minute
                                ⋮
                ;FFh: Timeout occurs after 255 second/minute
                (The deviation is approx 1 second.)
```

For further information, please refer to Winbond W83627DHG-P datasheet

# Contact information

Any advice or comment about our products and service, or anything we can help you please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.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